

**THE IMPACT OF SOCIAL SPACE DESIGN ON
STUDENTS' BEHAVIORAL PROBLEMS
IN MIDDLE SCHOOLS**

A Senior Scholars Thesis

by

RAEHEL DEANN SCHNEIDER

Submitted to the Office of Undergraduate Research
Texas A&M University
in partial fulfillment of the requirements for the designation as

HONORS UNDERGRADUATE RESEARCH FELLOW

April 2011

Majors: Environmental Design
Psychology

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ABSTRACT

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This study examined the impact of social space design on student behavioral problems in middle schools. A mixed-method approach was used in the form of focus groups and surveys with teachers and students from four central Texas middle schools (7th and 8th grade). Social space was defined as any space that students use while not in the classroom (e.g., hallways, cafeteria and outdoor spaces). Negative behavioral patterns were defined by the schools themselves but typically were any act that is physically or emotionally harmful to another student, oneself, or school property (e.g., stealing,

fighting and name-calling). For each space, design elements that were analyzed included seating, privacy, equipment, structure, and open space. Within one school, four key spaces were identified and students were surveyed regarding their opinions of the design and behavioral patterns within each space. Comparisons across spaces within and among the four schools showed areas that are overcrowded or lack supervision exhibit higher accounts of negative behavior. Structured social spaces and outdoor spaces have less instances of problematic behavior but only when overcrowding is not a problem. This study also uncovered design factors that were important to the students but were not originally considered such as their desire for safety. This result highlights the importance of student voice in design. Overcrowding, supervision and the balance of privacy and safety emerged as the main issues regarding social space design and behavioral patterns in middle schools.

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NOMENCLATURE

Caldwell MS

Caldwell Middle School

Corbett JH

Ray D. Corbett Junior High School

Dobie JH

J. Frank Dobie Junior High School

Navasota JH

Navasota Junior High School

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CHAPTER I

INTRODUCTION

Importance of research on educational facilities

Public education in the United States encompasses the daily lives of over 16% of the nation's population, with about 13,900 public school districts containing about 99,000 public schools enrolling approximately 49.8 million students. Students enrolled in public school in the United States spend approximately 30% of their waking life in their educational environment. In Texas, twenty-five million dollars were allotted for new facilities in the 2006-2007 school year, which was less than one percent of the total budget for education (Planty et al., 2009). The quality of school facilities is depleting and the design of schools is not a high priority. Many school districts use prototype designs to save money while still having the opportunity to build new facilities. However, more care needs to be taken in the design and adaptation of these prototypes (Aker, 2009).

Good school design plays an important role in successful education and there is a definitive correlation between poor facilities and the underachievement of students (Evans & Stecker, 2004; Evans, Yoo, & Sipple, 2010; McGowen, 2007). This can be an

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effect of the undue stress from the combination of low building quality and a heightened need for student mobility (Evans, et al., 2010). Poor facility conditions may also combine with measures of attendance, discipline, completion rate and teacher turnover to impact student achievement (McGowen, 2007). The amount of facility space also impacts the quality of time spent in the schools. High density and overcrowding are some of the larger issues of schools today and cause discomfort both in and out of the classroom. There have been studies showing that a more crowded classroom correlates with a lower level of student participation (Shapiro, 1975).

While educational research became a prominent focus in the mid-20th century with architects like William Caudill dedicating the majority of their research and time to explore open space design, adaptability, and nature in educational facilities (Caudill, 1954), there is a lack of comprehensive frameworks for current research on educational facilities. Among limited recent literature, Owen and Valesky's (2007) School Climate Model made excellent strides in accounting for the interaction between culture, space, and teaching method. Their model consists of the interaction of ecology (physical environment), staff culture, organization, and student milieu (social environment). While the existence of these interactions are apparent and significant, their model fails to fully expand on the impact that the physical environment can have on the other three factors (Gislason, 2010). Thus, there is still potential to further explore the ways in which the environment impacts the quality of education and children's experiences in their educational institutions. Neil Gislason (2010) worked to improve Owen and Valesky's

framework by increasing its focus on the ecological aspect of the interaction. His research determined that it is difficult to create an appropriate balance between environments for socialization and environments for learning. Thus, it is becoming increasingly apparent that we understand the impact the physical environment has on the quality of student life both in and out of the classroom.

Recent research is beginning to not only focus more on the physical environment but also to include the opinions of students. While some students may be too young to really understand the way their environment impacts them, studies on adolescents have shown their ability to think critically and serve as an aide in designing and understanding schools. The “Design Your School” day in the United Kingdom resulted in not only the receipt of many viable design options but also the improvement of student self-esteem from their increased stake in the design of their school environment (Newman & Thomas, 2008). The latter effects are especially important during the middle school age when personalities and desires are changing at a rapid rate. Similar results were seen in the “School I’d Like” Competition (Burke & Grosvenor, 2003) and the “Joinedupdesignforschools” project (Sorrell & Sorrell, 2005). Overall, all of these studies showed that children see the importance in the quality of their schools’ indoor spaces, comfort and control, activity spaces, nature and outdoor spaces, facilities, and the exterior of the school (Ghaziani, 2008). This study will involve students in the research process in order to get a better understanding of students’ space use and behavior

patterns while also giving the students a chance to be active participants in the design of their school.

Socialization and social spaces in educational facilities

The social environment of a school is characterized not only by the physical space the students use but also by the relationships students have within the space. The latter is dependent on the historical culture of the school and community as well as pupil-pupil and teacher-pupil interactions. A positive social environment is necessary to foster self-esteem and self-concept, increase participation, and improve behavior (Allodi, 2010; Cemalcilar, 2010; Evans & Stecker, 2004; Kutnick & Kington, 2005; Weinstein & Woolfolk, 1981). The environment affects students both in the short term through their academic achievement and current happiness as well as in the long run through their overall social development (Allodi, 2010). Unfortunately, there has been a lack of interest in the improvement of school social environment.

Gibson's (1977) Theory of Affordances contemplates that the perception of and behavior in the environment result from various affordances presented. Affordances vary with perception but basically refer to the actions that can potentially be performed by an individual in his or her environment. This theory has many applications in the design of environments, including schools (Clark & Uzzell, 2002). Socialization spaces are one important affordance in middle school facility design. Recent research states that social

interaction can increase cognitive development of students and improve positive behavior and motivation in the classroom (Kutnick & Kington, 2005).

The analysis of the social climate at school is especially important among those of adolescent age, because adolescents spent a significant amount of time at school and have an increased need for personal relationships. Students are influenced by not only the physical environment but also any emotions or preconceptions attached to the spaces. From essays written by high school students, Korpela (1992) discovered that spaces can be important to a student not only due to their physical features but also because of the activities that occur within them. The importance of these two aspects varies from person to person, making it difficult to create a social environment that pleases every variety of students. Thus, the social environment of an educational institution should work to support a vast array of behaviors and activities in order to satisfy the majority of the students' needs (Korpela, 1992).

Not only can socialization positively impact the well-being of the students but an increased sensation of social belonging is correlated with a reduction in behavioral problems (Cemalcilar, 2010). A three year study on 8-10th graders found a significant correlation between negative behavior patterns (e.g., substance abuse, truancy, and crime) and the attractiveness of their educational environments (Kumar, O'Malley, & Johnston, 2008). Behavioral problems were also reduced in areas where teacher visibility was at its highest and there were less unsupervised places for students to spend time in.

The study alluded that behavioral problems can be reduced by improving space design. However, the study focused on specific behavioral patterns such as substance abuse or truancy, and did not study the impact that spaces had on the general social behavioral patterns of the students.

It is also important to explore ways to improve the positive social interactions and reduce the amount of physical confrontations among students during their free time. The difficulty in completing such a study resides in the subjective nature of these confrontations and the various ways in which students take advantage of their social spaces and free time. Liu & Sibley (2004) completed several interventions in a college quadrangle to alter specific littering behaviors of the students. Their conclusion was that while the interventions were all successful to some degree, they were greatly affected by the difference between active and passive littering. Whether or not the littering was active or passive depended upon the time between the litter being placed in the environment and the time the person left the area. They discovered that it is simple to alter an active behavior as the person is purposefully acting in a certain way and thus will respond to direct visual cues. However, it is more difficult to alter passive behaviors that occur without the conscious knowledge of the user. It is possible that this can apply to the behavior of middle school students as many of the fights that occur are the result of active, rather than passive motivation. It is reasonable to expect that these fights can be reduced by altering the physical design of the space to allow for more visibility and reduce crowding.

Previous research shows that the physical environment can affect us as humans in many ways. This is seen in schools with the environment affecting student achievement (Evans & Stecker, 2004; Evans, et al., 2010; McGowen, 2007), participation ((Shapiro, 1975), morale (Korpela, 1992), and behavior (Kumar, et al., 2008; Liu & Sibley, 2004) .

Research also shows the importance of socialization in schools and the impact it can have on students' behavioral problems (Allodi, 2010; Cemalcilar, 2010). This study used these findings as a base to analyze the impact of social space design on students' behavioral patterns within these spaces at four Texas middle schools. It was hypothesized that there would be a correlation between the design of these social spaces and the students' behavioral problems within them. Such a study would generate information for schools to improve student behavior through alterations to their social spaces and provide a more thorough understanding of the ways students use them.

This study is intended to address some of the gaps in previous studies by taking a general look at the behavioral patterns instead of focusing on specific behaviors such as substance abuse or crime. Each space and school was observed on its own. Anticipated behavioral issues were fighting, stealing, verbal arguments, students seeking solitude, and positive conversation and play. It was hypothesized that many patterns would align with previous research and spaces with overcrowding or limited visibility problems would result in a higher amount of negative behavioral patterns whereas those more open and more supervised would have the least amount of behavioral problems.

CHAPTER II

RESEARCH DESIGN

Conceptual framework

The purpose of this study was to analyze the relationship between the design of a school's social spaces and the behavior of the students within the spaces. Junior high and middle school students (7th and 8th grade) were chosen as the population for this study. Behavioral problems are at a peak during these grades due to hormonal changes and quick periods of growth. The aim of the study was to understand what attributes of social space design can be used to impact the amount or type of behavioral problems that occur in these spaces.

This study examined various design attributes of the spaces such as the amount of seating, privacy, equipment, structure or open space provided as well as the students' rankings and opinions of spaces. Social spaces were also studied for their frequency of use by the students. Student behavior was measured through both surveys and focus groups and was not defined upfront as specific actions. Instead, the teachers and students identified the various behaviors, both positive and negative, that occur in their school. Data collection was conducted with a mixed-method approach. Triangulation was used in the analysis stage as results from different methods such as Principal Interviews, Teacher Focus Groups, Student Focus Groups, Teacher Surveys, and Student Surveys were compared to answer the research questions.

Study schools

The researcher's original intent was to work with College Station and Bryan Independent School Districts in Texas due to their diverse range of demographics and proximity to Texas A&M University. However, due to their rejection of the research application, the researcher had to refocus the study on the convenience sample of Caldwell Middle School (Caldwell MS) in Caldwell, Texas; Navasota Junior High School (Navasota JH) in Navasota, Texas; Ray D. Corbett Junior High School (Corbett JH) in Schertz, Texas and J. Frank Dobie Junior High School (Dobie JH) in Cibolo, Texas. The first two schools were selected primarily due to their proximity to Texas A&M University and willingness to participate. The latter two schools were selected due to the researcher's former matriculation through Dobie JH and the researcher's mother's employment at Corbett JH, and therefore, their willingness to assist in the research. The background information of these four study schools is listed in Table 1.

Table 1
Background Information for Study Schools

	Caldwell MS	Navasota JH	Corbett JH	Dobie JH	Texas averages
Accountability Rating:	Recognized	Acceptable	Recognized	Recognized	
Enrollment (number of students)					
6 th grade	142	195			
7 th grade	138	185	412	492	
8 th grade	164	198	353	514	
Gender Ratio					
Female	47%	49%	48%	48%	
Male	53%	51%	52%	52%	
Ethnic Distribution					
African American	9%	27%	11%	15%	14%
Hispanic	28%	38%	39%	29%	48.6%
Native American	<1%	<1%	<1%	<1%	0.4%
Asian / Pacific Islander	<1%	<1%	2%	3.5%	3.7%
White	63%	35%	47%	51.5%	33.3%
Economically Disadvantaged	45%	68.5%	35.4%	16.9%	59%
At-Risk	34%	47.4%	30.8%	27%	47.2%
Special Program Enrollment					
Bilingual	4.7%	6.4%	2%	1.5%	16.1%
Career & Technology	0.0%	0.0%	29.7%	37.5%	21.3%
Gifted & Talented	14.2%	4.7%	6.8%	5.6%	7.6%
Special Education	11.5%	8.1%	10.8%	9.5%	9.0%
Employment					
Total Staff	44	62	66	74	
Teachers	35	47	57	58	
Class Size	13-20	16-20	17-20	21-24	17-21
Student to Teacher Ratio	12.9	12.3	15.6	17.4	

Note: 2009-10 Academic Excellence Indicator System

Study participants

Although the original intention was to have every school participate in every step of the research, it was necessary to allow the schools flexibility depending on the support of the school principal, the classroom availability of the teachers, and the extracurricular set-up of the school. The schools determined their availability to participate further in the study after the initial principal interviews. Navasota JH participated in all four levels of the study, including a Teacher Focus Group, a Student Focus Group, Teacher Surveys, and Student Surveys. Dobie JH allowed for a Teacher Focus Group, Corbett JH and Caldwell MS allowed for Teacher Surveys.

The Teacher Focus Group at Dobie JH consisted of five members of the Social Studies department that taught 7th or 8th grade. The Social Studies Department Head was contacted by the school principal and requested that the focus group take place after school prior to a previously planned departmental meeting. The Teacher Focus Group at Navasota JH consisted of three members of the English department, who were recruited by the school principal. All teachers gave signed consent forms to participate and be audio recorded.

All teachers at Navasota JH, Caldwell MS and Corbett JH were asked to, but not required to complete two surveys. Surveys were distributed to their school mailboxes at Caldwell MS and Navasota JH by the researcher and at Corbett JH by a volunteer teacher along with a letter from the researcher explaining the survey and an introduction

sheet to the entire study. Teachers were given a week to complete the surveys and were asked to return them to the front office. No names or any individual identifiers other than the school name were included.

The Student Focus Group was only completed at Navasota JH and consisted of students who participated in an afterschool program. Student participation was solely based on students' willingness to participate. Signed consent forms were received from all participating students.

Forty-three 7th and 8th grade students at Navasota JH were asked to complete two surveys during their reading class. Classes involved were selected by a teacher appointed by the principal. Students were given as much time as needed to finish the survey but it typically took approximately 15 minutes to complete. The researcher was present in the room for the whole process to answer any questions posed by the students. Students were told that their completion of the survey and any questions were optional. They were ensured that their responses were completely anonymous and that while the school will see the overall results of the surveys, none of their individual responses would be seen by anyone other than the researcher and research advisers.

Research design

Four schools participated in the study, including Caldwell MS, Navasota JH, Corbett JH, and Dobie JH. This study was designed to involve both the students and the teachers in

order to get a thorough and well-rounded evaluation of the schools' social spaces and students' behavioral patterns within these spaces. The study consisted of multiple steps. In addition to an initial interview with all of the schools' principals, there were four types of data collection activities, including Teacher Focus Groups, Teacher Surveys, Student Focus Groups, and Student Surveys.

Principal interview

All four schools' principals participated in an informal interview during the beginning phase of the study. Questions posed included the principal's thoughts on the overall behavior of the school's students, opinions on the design of the school, review of the various social spaces, and general questions regarding the school's demographics, number of students, and number of teachers.

Teacher focus group

Two Teacher Focus Groups were completed; one with a small group of teachers at Dobie JH and the other at Navasota JH. The focus groups consisted of open discussion facilitated by the researcher using the floor plan of the school. The first question in the discussion asked about the teachers' general opinion of their schools' social culture and behavioral problems and where they occur. This led to a more in depth discussion of the teachers' opinions of the schools' design and behavioral problems and patterns. Throughout the discussions, color-coded comments were placed on the floor plans to

give a visual and descriptive view of the opinion of spaces and the behavior that occurs within them.

Teacher survey

The first section of the teacher survey consisted of questions regarding student behavior, which were adapted from the “Pupil Classroom Behavior Scale” developed by the University of Maryland Pupil Services Project (Mitchell, 1967) (Appendix A). A full copy of the Teacher Survey used in this study can be found in Appendix B. The survey questions regarding student behavior used a Visual Analog Scale and asked the teacher about the percentage of students that exemplified the following behavioral traits:

1. Shows enthusiasm toward learning activities, being with classmates and, in general, being in school.
2. Cooperates with teacher requests for quiet, for starting work and for changing activities.
3. Behaves well during free time (recess, lunch, before/after school).
4. Blows up, becomes excited, and loses self-control when unable to do what he wants to do.
5. Chooses specific locations to participate in negative behavioral patterns (fights, stealing, etc.).
6. Shows little concern for the needs, problems and feelings of others.
7. Has difficulty following teacher directions or instructions.

8. Disobeys or rebels against reasonable school authority (teachers, rules, regulations).
9. Gets into fights or quarrels with other pupils.
10. Has to be coaxed or forced to work or play with others.
11. Makes unusual or inappropriate responses during normal school activities.
12. Behaves in ways which are dangerous to self or others.
13. Is unhappy or depressed.
14. Becomes upset or sick when faced with a difficult school problem or situation.

The second section of the teacher survey consisted of statements regarding the social environment at the teachers' school. It was measured using the five-point Likert Scale (5 = Strongly Agree; 4 = Somewhat Agree; 3 = Neither Agree nor Disagree; 2 = Somewhat Disagree; 1 = Strongly Disagree) and asked teachers how much they agree or disagree with the following statements:

1. Our school has enough social spaces to meet the students' socialization needs.
2. Our school gives the students enough free time to socialize.
3. Our school's social space design allows for a variety of activities for students during their free time.
4. There is enough of each of the following design elements in our school's social spaces.

- a. enough seating
 - b. enough privacy
 - c. enough equipment (e.g., items for games, structures to play on, sports balls)
 - d. enough structure (defined areas for certain activities)
 - e. enough open space
5. There are a lot of behavioral problems at our school during students' free time.
 6. The students at our school do not have a very good relationship with one another.
 7. The design of the social spaces at our school impact the type of behavioral problems that occur.
 8. The design of the social spaces at our school impact the amount of behavioral problems that occur.

Teachers were also given an open-ended question: “What would be the changes you would make to your school’s social space design to reduce behavioral problems?”

Student survey

The Student Survey was only conducted at Navasota JH due to scheduling difficulties with the other three schools. The first part of the student survey used photographs of four social spaces at Navasota JH (the courtyard, cafeteria, hallways and the front of the

school) with accompanying survey questions (statements regarding students' opinions and use of the spaces). A full copy of the Student Survey used in this study can be found in Appendix C. Students were asked to choose from the five-point Likert Scale items (5 = Strongly Agree; 4 = Somewhat Agree; 3 = Neither Agree or Disagree; 2 = Somewhat Disagree; 1 = Strongly Disagree) to indicate how much they agree or disagree with the following statements:

1. I use this space very often.
2. A lot of students use this space.
3. There are a lot of behavioral problems in this space.
4. This space allows me to do many different activities.
5. I enjoy this space.
6. I would keep this space exactly the same.

Students were also asked to rank the four spaces from their most favorite to least favorite (1 = Most Favorite, 4 = Least Favorite) as well as answer two open-ended questions: "What types of activity do you do in this space?" and "What would you do to change this space?"

The second part of the student survey asked general questions about their school's social space design, affordances and behavioral issues. The survey questions used the five-

point Likert Scale and asked students how much they agree or disagree with the following statements:

1. Our school has enough social space to meet our socialization needs.
2. Our school gives us enough free time to socialize.
3. Our school's social space design allows for a variety of activities during our free time.
4. I would enjoy my free time more if the social space design at my school was different.
5. There is enough of each of the following design elements in our school's social spaces.
 - a. enough seating
 - b. enough privacy
 - c. enough equipment (e.g., items for games, structures to play on, sports balls)
 - d. enough structure (defined areas for certain activities)
 - e. enough open space
6. There are a lot of behavioral problems at our school during our free time.
7. The students at our school do not have a very good relationship with one another.
8. The design of the social spaces at our school impact the type of behavioral problems that occur.

9. The design of the social spaces at our school impact the amount of behavioral problems that occur.

Students were also asked the open-ended question: “What would be the changes you would make to your school’s social space design to reduce behavioral problems?”

Data analysis

Principal Interviews were informal and notes from the researcher were used to convey the main points and results from this phase of the study. Teacher and Student Focus Groups were audio recorded and then transcribed verbatim. The transcripts were then used to identify themes from the conversation. Teachers and students aided the research by color-coding floor plans of the school. These were used to visually identify problematic areas in regards to behavioral issues.

Teacher and Student Survey results were inputted into IBM SPSS Statistics, Version 19. Responses for the Teacher Surveys were compared across the schools and responses for the Student Surveys were compared across the four social spaces. Descriptive analysis was run using the SPSS software to examine the means, minimum, maximum, and standard deviation of the responses for each question, within each school. Student and teacher responses were also compared.

CHAPTER III

RESULTS

Principal interviews

The principals at Dobie JH, Corbett JH, Caldwell MS, and Navasota JH were all interviewed in order to obtain an initial understanding of the schools' culture and design. The principals were asked to identify the various social spaces at their school and outline the behavioral problems at the school, including the types of problems and the locations of their occurrence.

Dobie Junior High

The principal at Dobie JH defined the following social spaces in the school: the cafeteria, the breezeway, and the outdoor area in the afternoon as students wait for parent pick-up (Figure 1). The behavioral patterns vary throughout the day and time of year but problems typically occur more during transitional periods. The principal felt this is mostly due to congestion from having too many students in too small a space. The door swing direction out into the hallways also poses a problem as they reduce the amount of available space for traffic flow when open.

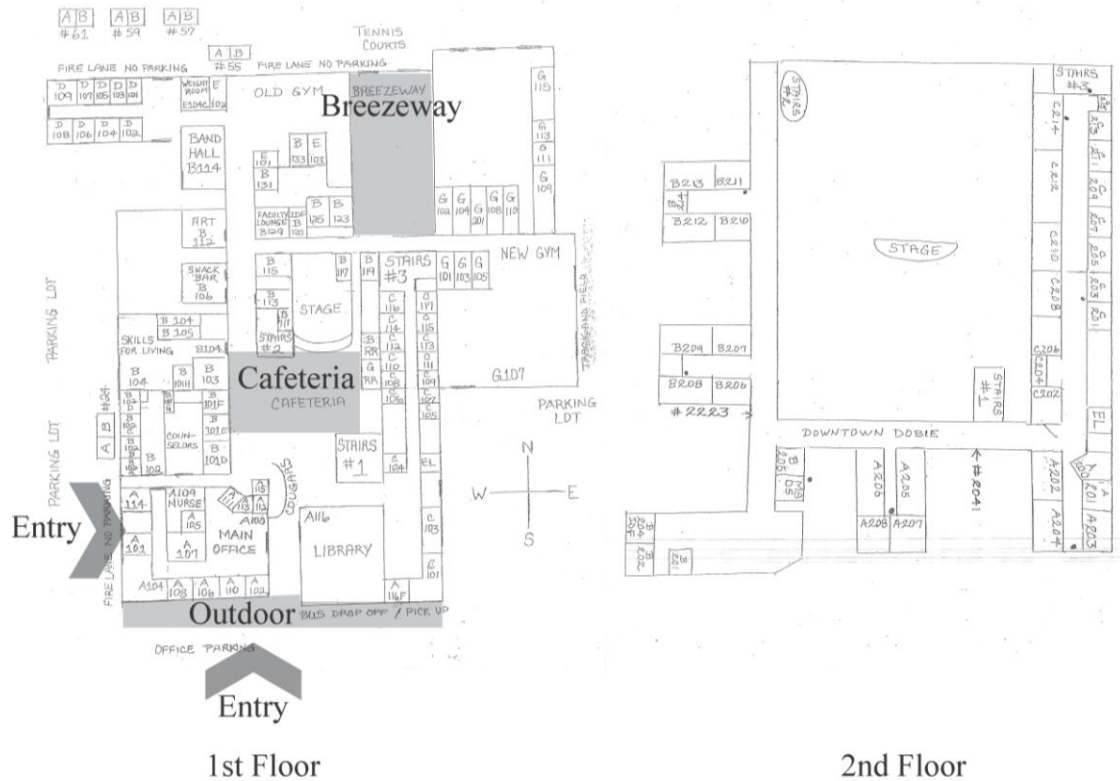


Fig. 1. Floor Plan of Dobie Junior High School

Corbett Junior High

Corbett JH has four main social spaces: the cafeteria, a picnic area, an outside area to wait for buses, and the hallways. The principal described the overall student behavior at the school as positive, especially when compared to behavior in their old building. The new building was completed in 2009 and the principal said they were very proactive in the design in order to reduce the amount of behavioral problems. The most notable difference between the old and new buildings is the reduction of nook spaces. The floor plan is focused around the central office and has two main groups of classrooms with access monitored by the office (Figure 2). This design was meant to create an

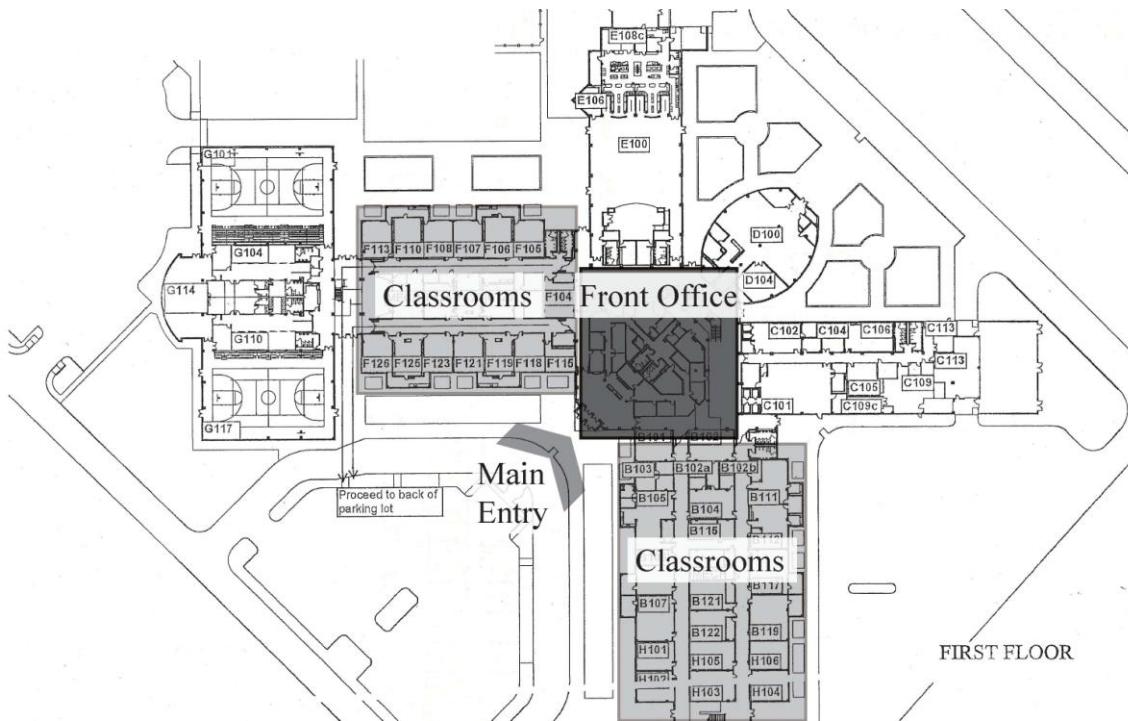


Fig. 2. Floor Plan of Corbett Junior High School

When constructing their new building, Corbett JH installed approximately 80 security cameras around the school. The principal stated that these have reduced the amount of problems since the students are always being watched. However, they don't prevent all problems and the areas with the most behavioral issues are the boys' bathrooms, the bus area in the afternoons, and the hallways between classes. It was assumed by the principal that most of these problems are due to lack of supervision or overcrowding.

Caldwell Middle School

The principal at Caldwell MS defined the school's social spaces as the cafeteria, gym, the hallways, the picnic area and the outdoor areas. The most notable difference between Caldwell MS and the other three study schools is the amount of outdoor access they give their students. The school consists of multiple standalone buildings connected with outdoor circulation space (Figure 3). During lunch, students can use the majority of the outdoor areas, including the football field and track. In the mornings, students gather in the gym – the boys on one end and the girls on the other. The principal said this separation helps reduce the number of behavioral problems. After school, the students all gather outside while they wait for the bus or parent pick-up. The principal pointed out a particular wall that is outside of the front office by which students tend to loiter and occasionally cause problems. However, the principal felt there are few behavioral problems at the school and the students are generally well-behaved.

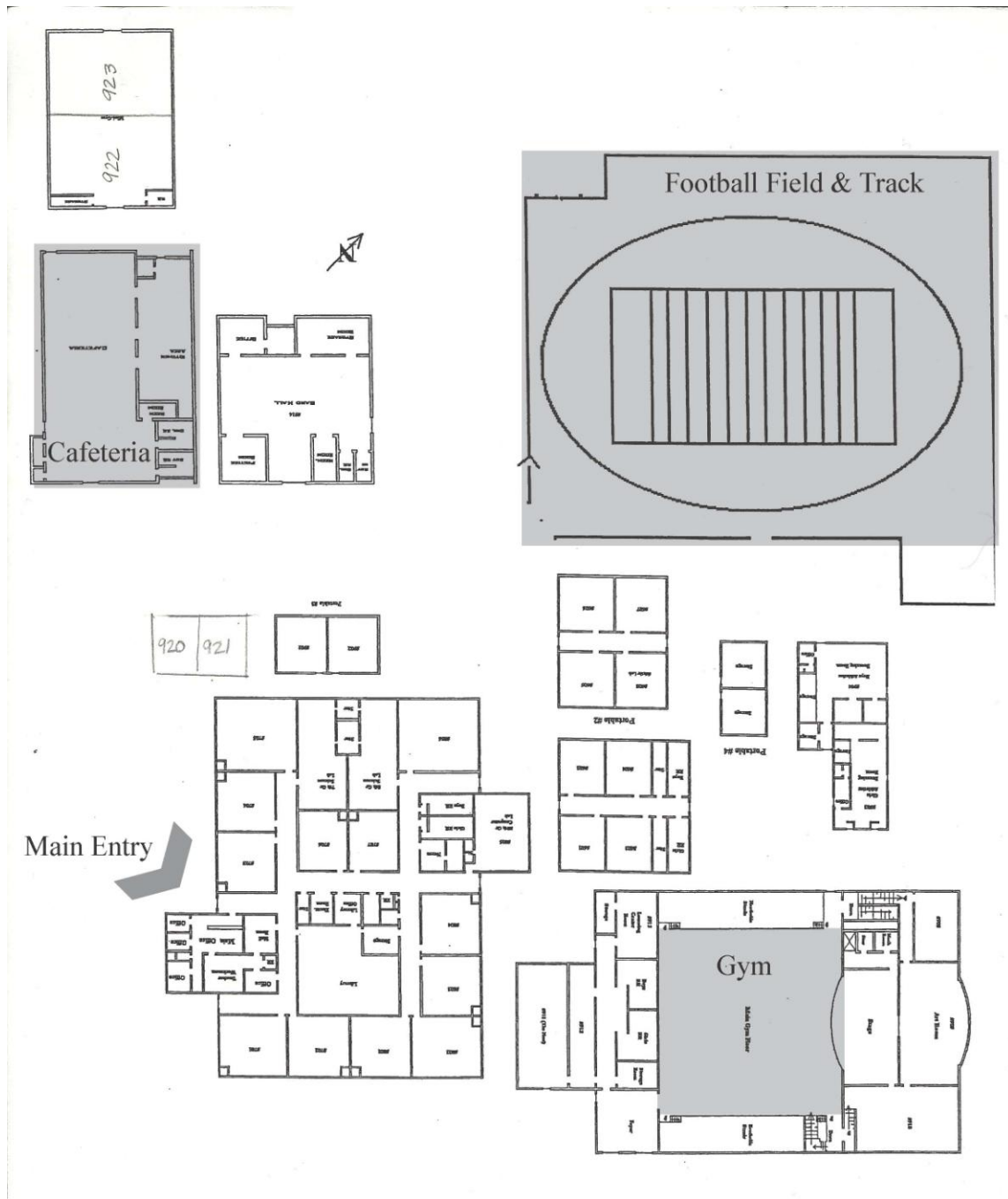


Fig. 3. Floor Plan of Caldwell Middle School

The vice-principal at Caldwell MS was also interviewed. It was stated that most problems occur in the boys' locker room and on the boys' side of the gym in the mornings. The students also tend to group themselves in cliques based on race or gender. During lunch, the girls tend to walk around the track and gossip while the boys play on the football field. Overall, while some problems do occur in the outdoor areas, having sufficient outdoor spaces is beneficial for reducing the overall amount of behavioral problems.

Navasota Junior High

The principal at Navasota JH defined the social spaces as the courtyard, the cafeteria, the hallways, and the front of the school (Figure 4). There is approximately a fight a day in the courtyard as students use this space as their meeting point. The principal also noted differences between the students who choose to spend time in the various social spaces. This is especially apparent in the courtyard as students appear to divide themselves up into groups based on race or activity preference (e.g., the "band kids" and the "athletes"). However, he stated that the overall demographics of the social spaces remain consistent throughout the school but the behavior within the spaces does not. Thus, he attributed behavior differences to the spaces' designs rather than to differences among the spaces' users.

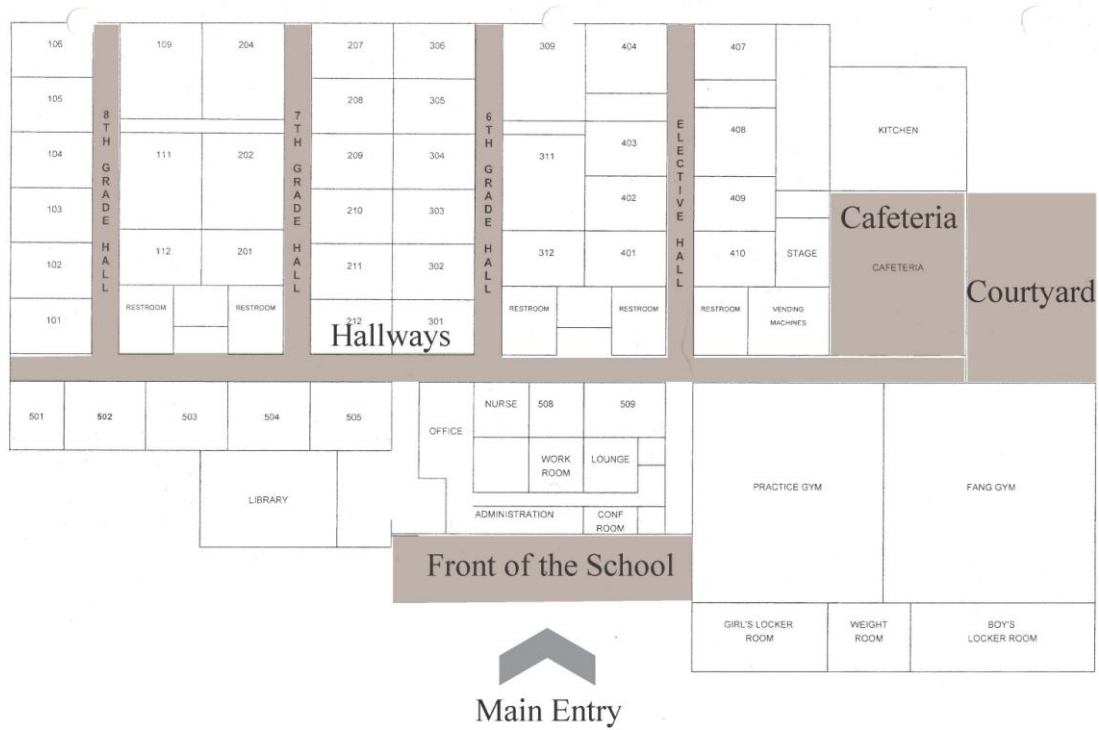


Fig. 4. Floor Plan of Navasota Junior High School

Teacher focus groups

Teacher Focus Groups were completed at Navasota JH and Dobie JH. Both were audio-recorded. The purpose was to have a more thorough understanding of the schools' design and student behavior from the teachers' perspectives. This information was also used in the development of the Teacher and Student Surveys.

Dobie Junior High

The teachers at Dobie JH generally disliked the design of their school in terms of both classroom design and social space provisions. The building was originally constructed in 1974 as an intermediate school and became a junior high in 1998. The building has had multiple renovations and additions resulting in an incohesive floor plan. The following locations were pointed out as having the most behavioral issues: the breezeway on the first floor, the nook behind B206 on the second floor, the Technology Wing and Old Gym intersection on the first floor, Stair 2, Stair 3, the downstairs hallways and Science Wing hallways and the outdoor area near the principal's office (Figure 5).

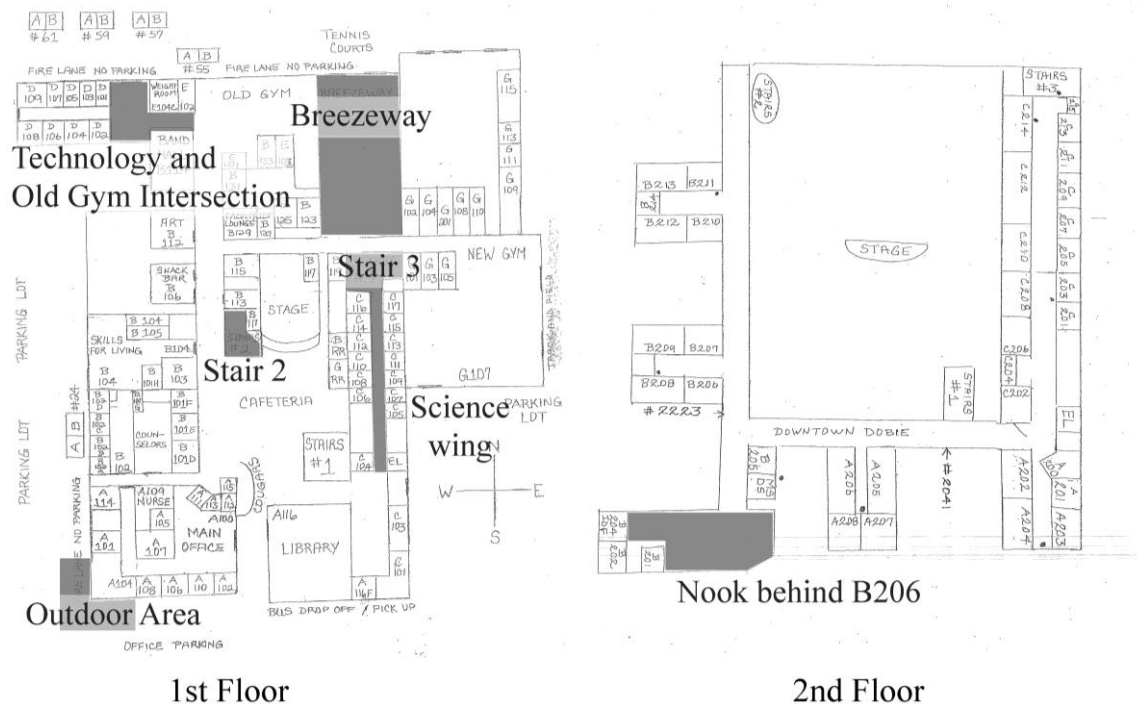


Fig. 5. Annotated Floor Plan of Dobie Junior High School

The breezeway serves as a “kids’ hideout” after school. The teachers said that for a time it functioned well but due to recent increases in enrollment, there are too many students to supervise. Students typically hide there in the mornings since it is easy for them to run out from the back doors if a teacher comes by. Teachers feel this area is dangerous. The hallway connected to the breezeway is also a problem as it has no classrooms and nothing but lockers. The nook upstairs behind B206 is a location where students go to fight, “make-out,” chase each other, steal, and use their cell phones. Teachers said this area is difficult to supervise and is away from the typical flow of traffic. The area between the Technology Wing and the Old Gym is a location prone to bottlenecks. The teachers also discussed how the lack of classrooms in this transitional area makes it more difficult to monitor.

Stair 2 has a small landing and its own balcony that looks down on the walkway below. Teachers said that students will stand there and spit on people walking below and drop things. Lockers also begin at these stairs and cause a buildup of traffic. Teachers felt it is an “unnecessary landing that causes mischief.” Many students also run around in this area on their way to class. Stair 3 was the most recent addition built to relieve congestion. However, this area is still overcrowded with traffic during transitional periods, especially when the athletic period is over. Stair 3 is also secluded and requires more supervision as the space was the site of many behavioral problems when first built.

Multiple hallways were also brought up by the teachers as places with many behavioral problems, especially the Science Wing hallway and those downstairs. The main causes for problems stated by the teachers are the areas where lockers are on both sides of the hallways. When open, these lockers make room for only one person to move through at a time. This congestion results in banging, shoving, and bottlenecking. There are also both top and bottom lockers which cause students to be crowded around their own locker. Many students put their stuff on the ground while opening their lockers and their belongings will get kicked. The teachers also stated that the students typically travel in groups as they move from one of their lockers to another. This happens mostly during lunchtime and causes many students to be tardy and creates even more congestion.

The outdoor “L”-shaped area outside of the principal’s office is a place many students “hide” before and after school. Many fights occur there and it is easy for students to run away if they are caught.

Despite the negative aspects of their school’s design, teachers from Dobie JH felt that the second floor and balcony are positive elements of its design. The cafeteria is in a central location and the balcony extends around it with the majority of the classrooms in this central area. The teachers felt that this openness is the key. One teacher stated that a school should never have hallways.

Navasota Junior High

The teachers at Navasota JH felt their students' behavioral problems were typical of a school serving this particular age group. The school was built in 1994 and has not gone through any major changes. The school has various security cameras set up and teachers felt that the cameras have a positive influence on student behavior. From the discussion and the teachers' use of color coded dots on a school floor plan, the following locations were pointed out as having the most behavioral issues: hallways, the cafeteria, the courtyard, the restrooms, and the outdoor area near the library (Figure 6).

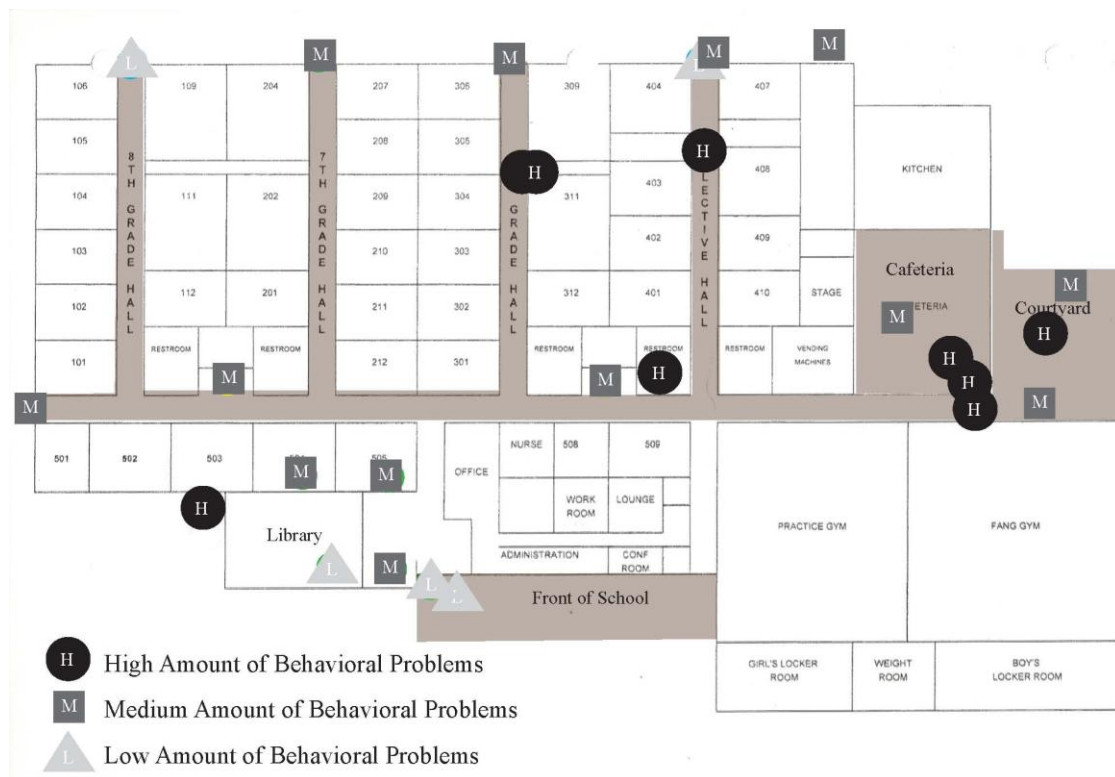


Fig. 6. Floor Plan of Navasota Junior High School – Results from Teacher Focus Group

The center of the secondary hallways is where many students choose to gather in large groups and a place where many behavioral problems occur. These areas of the hallways have closets or science labs. The teachers believed this is the cause of the behavioral problems because there is no direct supervision from a teacher's classroom. The hallways are also a problem in areas where lockers flank both sides of the hall. Teachers at Navasota JH cited the same behavioral problem of students traveling to lockers in groups as Dobie JH. They also stated that students sharing lockers create the similar problem of clumping and congestion.

The cafeteria and courtyard are also areas with many behavioral issues. These are the areas where students congregate before and after school and during lunch. The teachers said these areas were especially troublesome after school since problems have been building all day. They stated that both spaces are very crowded and noisy, making it difficult to pinpoint where little problems are about to start. Navasota JH is a very busy campus and many activities take place after school, requiring students to be in different places. This makes it difficult for teachers to monitor which students are supposed to still be at the school. There is also a nook area outside the cafeteria where many students go to for what was described by teachers as "hormonal inspired near-activity" or "making out." Most of the teachers keep their focus solely on the cafeteria, allowing students to utilize the space unnoticed.

The restrooms also pose problems as they are the only place students can go without any supervision. Teachers stated that many students who do not want to report to the cafeteria in the morning will go and “hide” in the restrooms. Students also utilize this space when trying to skip class. There are also outdoor areas that pose problems such as the area outside of the library. Students congregate there after school since they are out of sight from the teachers on duty. The teachers have tried to adjust their points of supervision but problems still seem to occur.

One area that the teachers felt never has any behavioral issues is the front of the school where students wait for parent pick-up. This front area is under constant supervision due to its proximity to the front office as well as the parents waiting for their children. In the morning, when students enter the school through this space, teachers say they move straight through and do not linger. The teachers also felt the overall design of their school was efficient as there are not too many “nooks and crannies” or “hiding places.” They said they feel safer in their school compared to others they have visited.

Student focus groups

A Student Focus Group was completed at Navasota JH with five students who participated in an after-school program. Their general attitude towards their school’s design was negative and they felt that there were a lot of behavioral problems. Contrary to the teachers’ opinions, the students felt that the security cameras set up around the school had no effect on behavior and that “[the students] don’t care.” From the

discussion and the students' use of color coded dots and a school floor plan, the following locations were identified as having the most behavioral issues: the courtyard, the cafeteria, and the hallways (Figure 7).

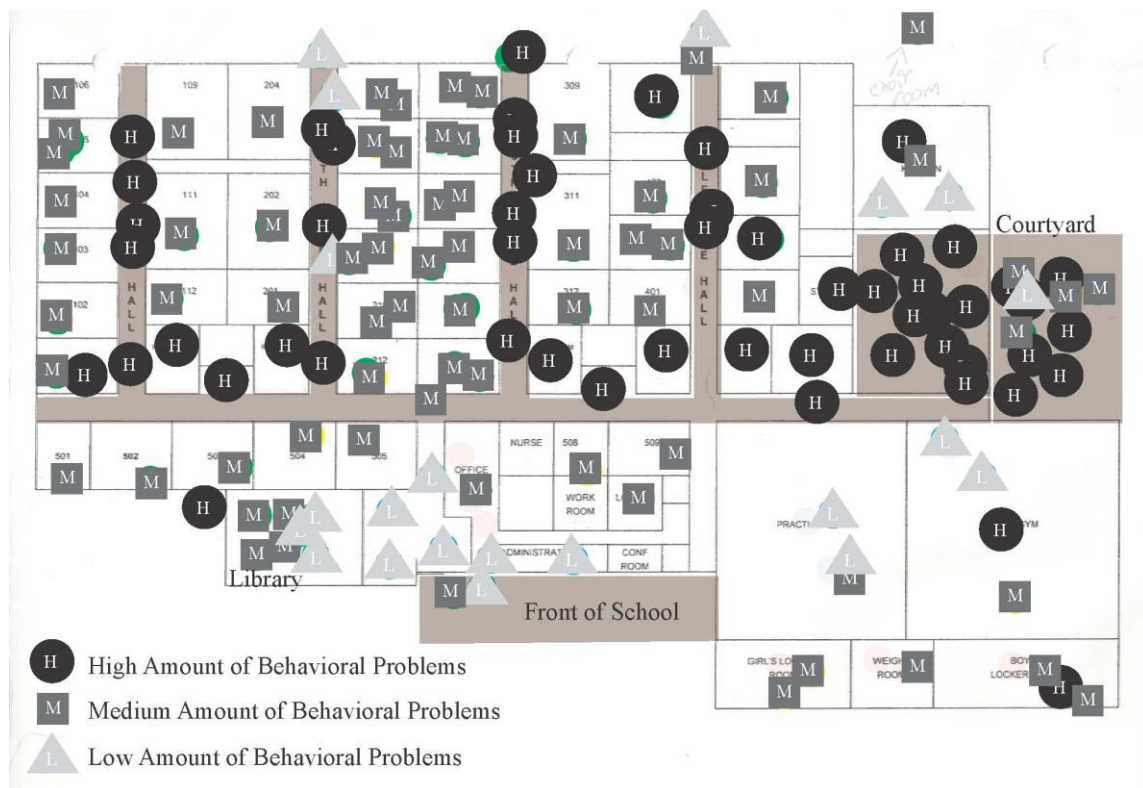


Fig. 7. Floor Plan of Navasota Junior High School – Results from Student Focus Group

The first place the students mentioned when asked about behavioral problems was the courtyard. They stated this area is a problem not just during the school day but also in the evening, when students meet and fight here. They said most of the fights get started in the morning, with physical violence occurring later in the day. The students felt the

courtyard does not have enough seating and is too crowded. Most students expressed that it is the area that they enjoy the most but also the area where most problems occur.

The students stated that almost every hallway is bad because they are the places you can go to plan and execute fights if things happen during class. They also identified the same location as the teachers did at the center of the secondary hallways as sites of behavioral problems. The students did not articulate any possible cause but said that they would plan to meet by the doors in the middle for fights. The students also expressed frustration with the layout of the lockers in the hallways and felt they did not have enough room and people “tapped” each other when they walked by and caused conflicts to develop.

One student brought up the topic of safety and the students agreed that they would like to have places where there are enough teachers present to keep everything in control but few enough to still make them feel as if they have freedom. The students said they felt safe near the office but not in the courtyard or on the buses. Some of their favorite locations included the library and the area directly outside of it. One stated the library was “so quiet and warm” and “you don’t have to deal with anybody.” Another student who enjoys the area outside of the library said “it’s quiet” and there are “chairs and you can just sit there and talk.”

When asked what they would change about their school, most students said they need more room. Many also mentioned adding more color to the walls. The students also

brought up the issue of maintenance and said that the restrooms constantly need to be fixed and always have students vandalizing them. They also agreed with the teachers regarding the absence of behavioral problems in the front of the school. The students attributed this to the fact that parents were around this area and that “all the bad people ride buses.”

Teacher surveys

Teachers at Corbett JH, Caldwell MS and Navasota JH were asked to complete a two-part survey, the first asking questions regarding their school’s social spaces and the second asking questions regarding their students’ behavior (Appendix B). Forty-one surveys were returned from these schools. Although this sample size was not enough to allow for statistical tests, the responses do allow for descriptive analysis and give insight into the teachers’ opinion regarding their schools’ design.

Questions about social spaces

The survey questions about social spaces using the five-point Likert Scale (5=Strongly Agree; 4=Somewhat Agree; 3=Neither Agree nor Disagree; 2=Somewhat Disagree; 1=Strongly Disagree). Means of all questions for each school are illustrated in Figure 8. Four questions showed differences in their mean values across schools. These questions are: “there is enough equipment in our school’s social spaces;” “there are a lot of behavioral problems at our school during students’ free time;” “the students at our school do not have a very good relationship with one another;” and “the design of the

social spaces at our school impact the type of behavioral problems that occur” (Table 2). Caldwell MS teachers reported less behavioral problems (mean = 1.68) and less negative student relationships (mean = 1.87) than Corbett JH (mean for behavioral problems = 3.89; mean for negative student relationships = 2.72) and Navasota JH (mean for behavioral problems = 3.73; mean for negative student relationships = 2.67). Navasota JH teachers reported the need for more equipment in its social spaces as well as the strongest connection between social space design and the type of behavioral problems that occur.

Table 2
Descriptive Statistics of Variables in Teacher Survey

	Corbett JHS (N=18)	Caldwell MS (N=16)	Navasota JHS (N=15)
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)
There is enough equipment in our school's social spaces.	3.167 (1.465)	3.000 (1.211)	2.267 (1.335)
There are a lot of behavioral problems at our school during students' free time.	3.889 (1.023)	1.688 (0.704)	3.733 (1.032)
The students at our school do not have a very good relationship with one another.	2.722 (1.074)	1.875 (1.147)	2.667 (1.047)
The design of the social spaces at our school impact the type of behavioral problems that occur.	2.944 (0.938)	2.750 (0.931)	3.467 (1.060)

S.D.: Standard deviation

The questions used a five-point Likert Scale, where 5=Strongly Agree; 4=Somewhat Agree; 3=Neither Agree nor Disagree; 2=Somewhat Disagree; 1=Strongly Disagree.

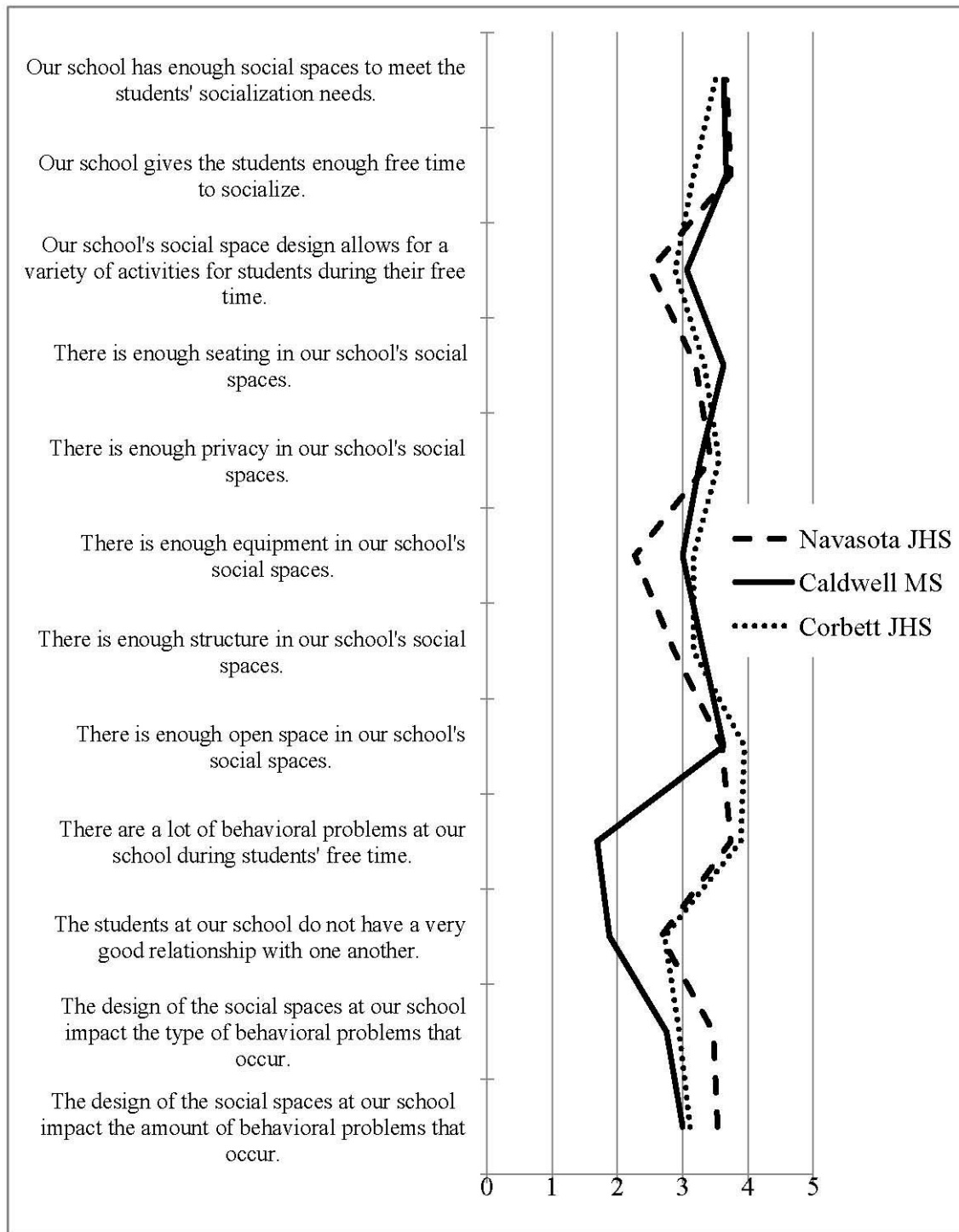


Fig. 8. Mean Values of Variables in Teacher Survey: Questions about Social Spaces. Survey respondents were asked to indicate how much they: 5=Strongly Agree; 4=Somewhat Agree; 3=Neither Agree nor Disagree; 2=Somewhat Disagree; 1=Strongly Disagree with the statements.

Questions about student behavior

Teachers were also asked to evaluate the prevalence of students' behavioral problems on a Visual Analog Scale (0=0% of students display trait; 100=100% of students display trait). The mean values of each question were compared across schools and are illustrated in Figure 9. Teachers from Caldwell MS reported fewer students displaying negative behavior traits and more students displaying positive behavior traits. It was reported by teachers that only 19.0% of students from Caldwell MS have difficulty following directions compared to the 40.8% and 40.7% from Corbett JH and Navasota JH respectively. Teachers also reported that 83.3% of Caldwell's students behave well during free time, whereas only 52.1% from Corbett JH and 57.1% from Navasota JH are reported as behaving well. Navasota JH teachers reported the most negative student behavior on nine of the fourteen traits. Corbett JH teachers reported the most students displaying negative behavior traits on the remaining five traits and Caldwell JH teachers never reported as having the most students displaying any of the negative behavior traits.

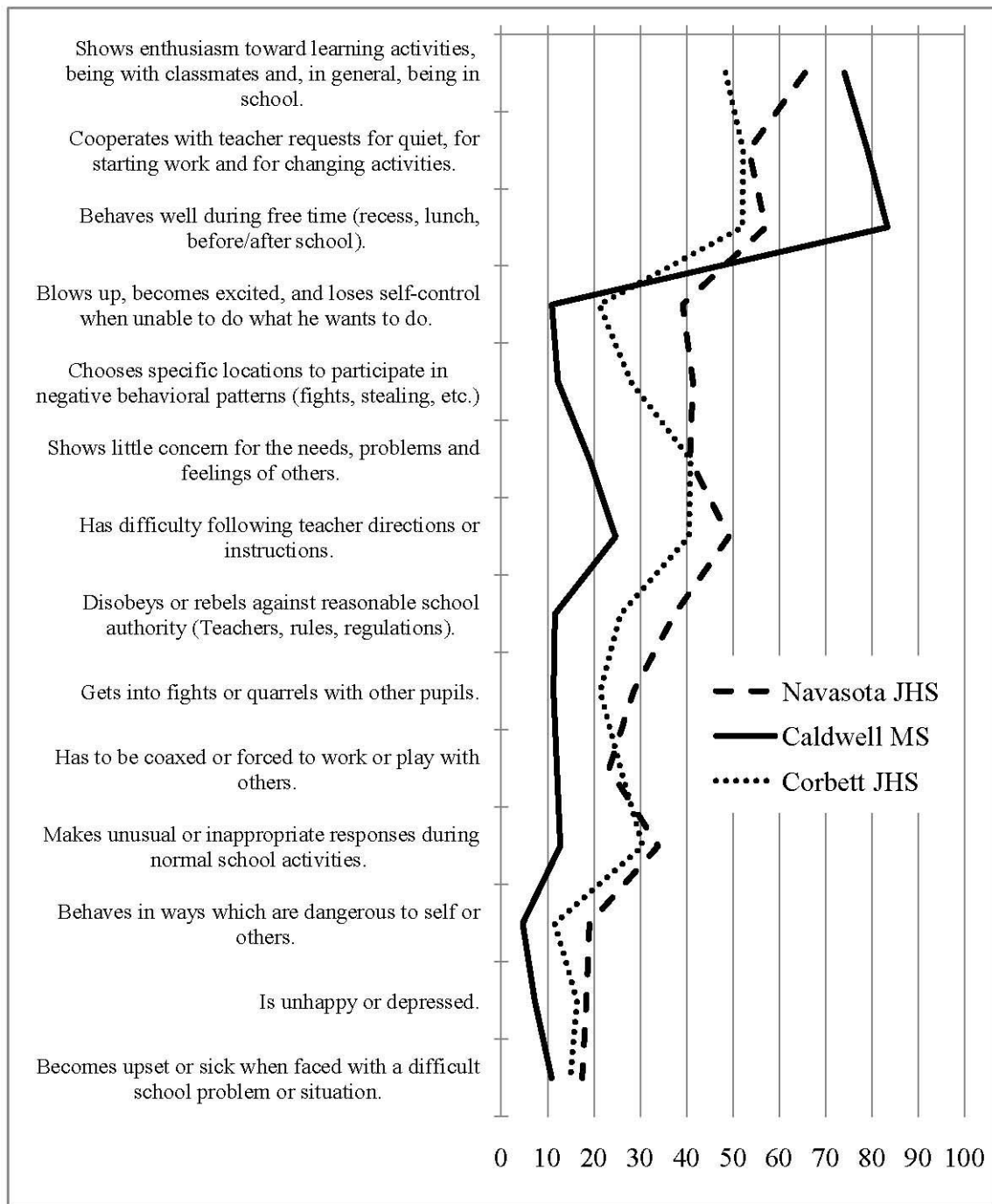


Fig. 9. Mean Values of Variables in Teacher Survey: Questions about Student Behavior. Survey respondents were asked to indicate what percentage of students displayed given traits (0 = 0% of students display trait; 100 = 100% of students display trait).

Student surveys

Forty-three students at Navasota JH were given surveys asking about their opinions of their school's social space design and the four specific spaces in the school (Appendix C). Students were first asked the same set of questions as the teachers regarding the social spaces at their school. The questions were answered using the five-point Likert Scale and means of all questions are illustrated in Figure 10. Their mean values were then compared with those of the teachers to examine if there were any differences in opinion between the two groups. Differences in means between student and teacher surveys was detected in five questions: "our school gives the students enough free time to socialize;" "our school's social space design allows for a variety of activities for students during their free time;" "there is enough privacy in our school's social spaces;" "there is enough open space in our school's social spaces;" and "there are a lot of behavioral problems at our school during students' free time" (Table 3).

When comparing the responses from all of the questions, the teachers had a combined mean value of 3.16 compared to the student mean value of 2.89 (some values were converted to make the traits comparable in the same scale direction). Students on average reported less satisfaction with their school's social space design. Students gave much lower ratings on the amount of time given to socialize (mean = 2.00) and the amount of privacy (mean = 2.29) and open space (mean = 2.80) provided to students. Students did report that their social spaces allow for a variety of activities whereas

teachers did not. Teachers reported more behavioral problems and a worse relationship among students than the students themselves reported.

Table 3
Descriptive Statistics of Variables in Student and Teacher Responses to Survey Questions

	Student Response (N=43)	Teacher Response (N=15)
	Mean (S.D.)	Mean (S.D.)
Our school gives the students enough free time to socialize.	2.000 (1.288)	3.733 (1.033)
Our school's social space design allows for a variety of activities for students during their free time.	3.098 (1.411)	2.500 (1.454)
There is enough privacy in our school's social spaces.	2.286 (1.436)	3.429 (1.452)
There is enough open space in our school's social spaces.	2.800 (1.488)	3.600 (1.121)
There are a lot of behavioral problems at our school during students' free time.	3.049 (1.303)	3.733 (1.033)

S.D.: Standard deviation

The questions used a five-point Likert Scale, where 5=Strongly Agree; 4=Somewhat Agree; 3=Neither Agree nor Disagree; 2=Somewhat Disagree; 1=Strongly Disagree.

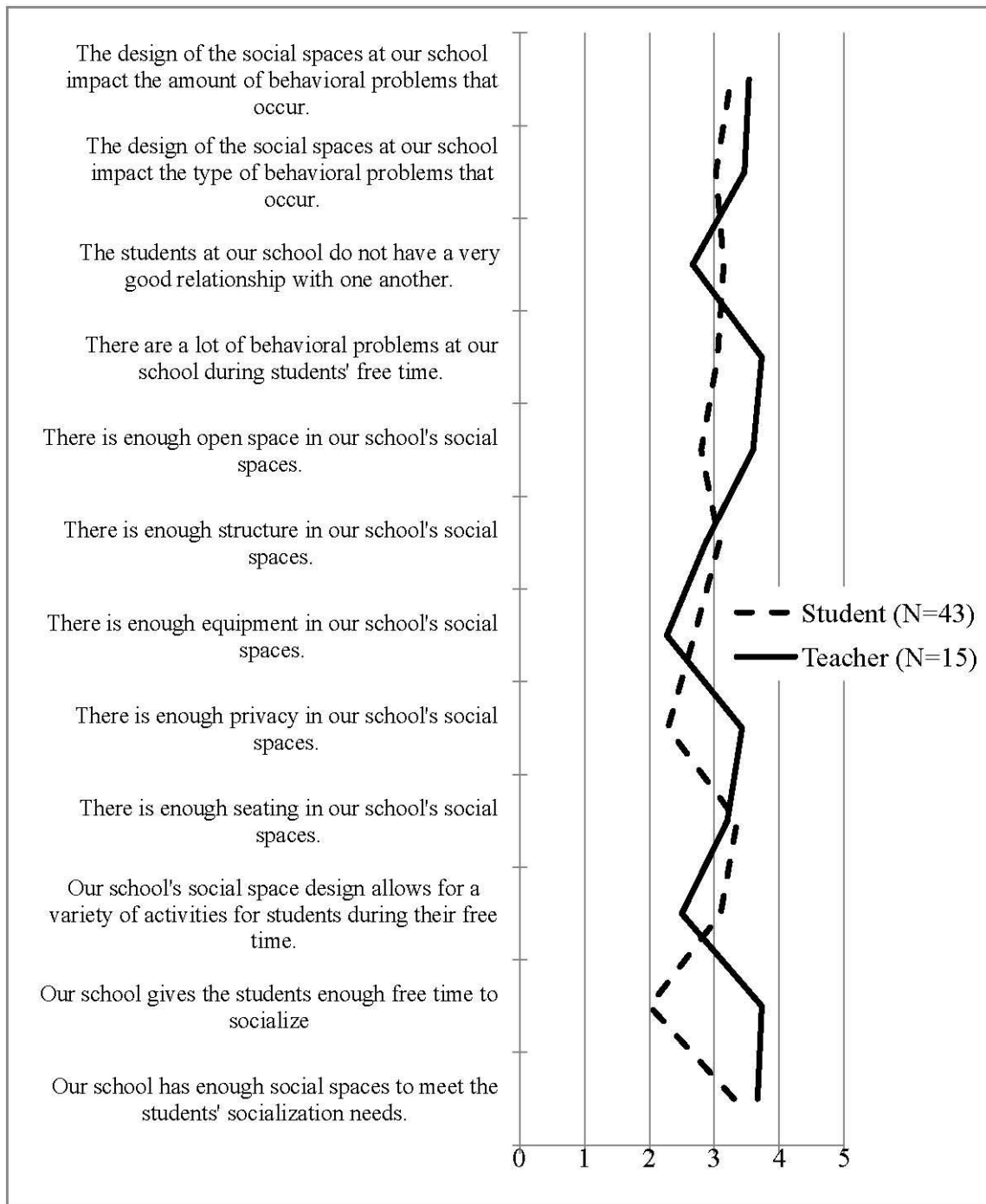


Fig. 10. Mean Values of Variables in the Student Survey and the Teacher Survey: Questions about Social Spaces. Survey respondents were asked to indicate how much they: 5=Strongly Agree; 4=Somewhat Agree; 3=Neither Agree nor Disagree; 2=Somewhat Disagree; 1=Strongly Disagree with the statements.

In the second part of the student survey, students were asked to evaluate four different spaces at their school: the courtyard, the cafeteria, the hallways, and the front of the school. When asked to rank the spaces from the most to least favorite, the most common sequence was: Courtyard, Cafeteria, Hallways, and the Front of the School (Figure 11). Students were also asked various questions regarding the four spaces. The survey questions about these specific social spaces used the Likert Scale. Means of all questions are illustrated in Figure 12. The overall least liked and least used space was the Front of the School. A significant difference was seen in the question “This space allows me to do many different activities.” The courtyard (mean = 3.750) was ranked higher than the other three spaces on this question. The responses to the question “I enjoy this space” match the order of the aforementioned rankings by the students (Most to Least Favorite: Courtyard, Cafeteria, Hallways, Front of School).

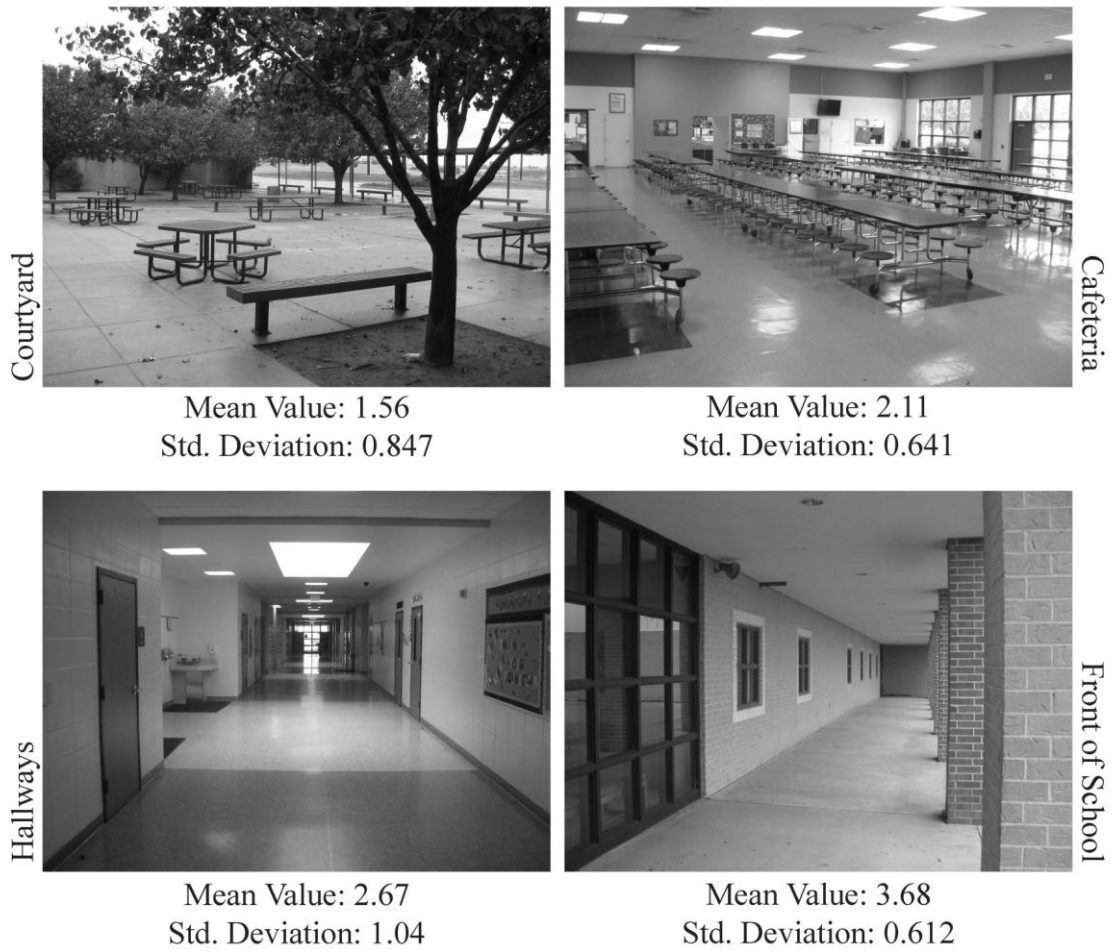


Fig. 11. Mean Values of Ranking Variable in Navasota Junior High School Student Survey (N=28). Survey respondents were asked to rank the four spaces from 1 to 4 (1=Most Favorite; 4=Least Favorite).

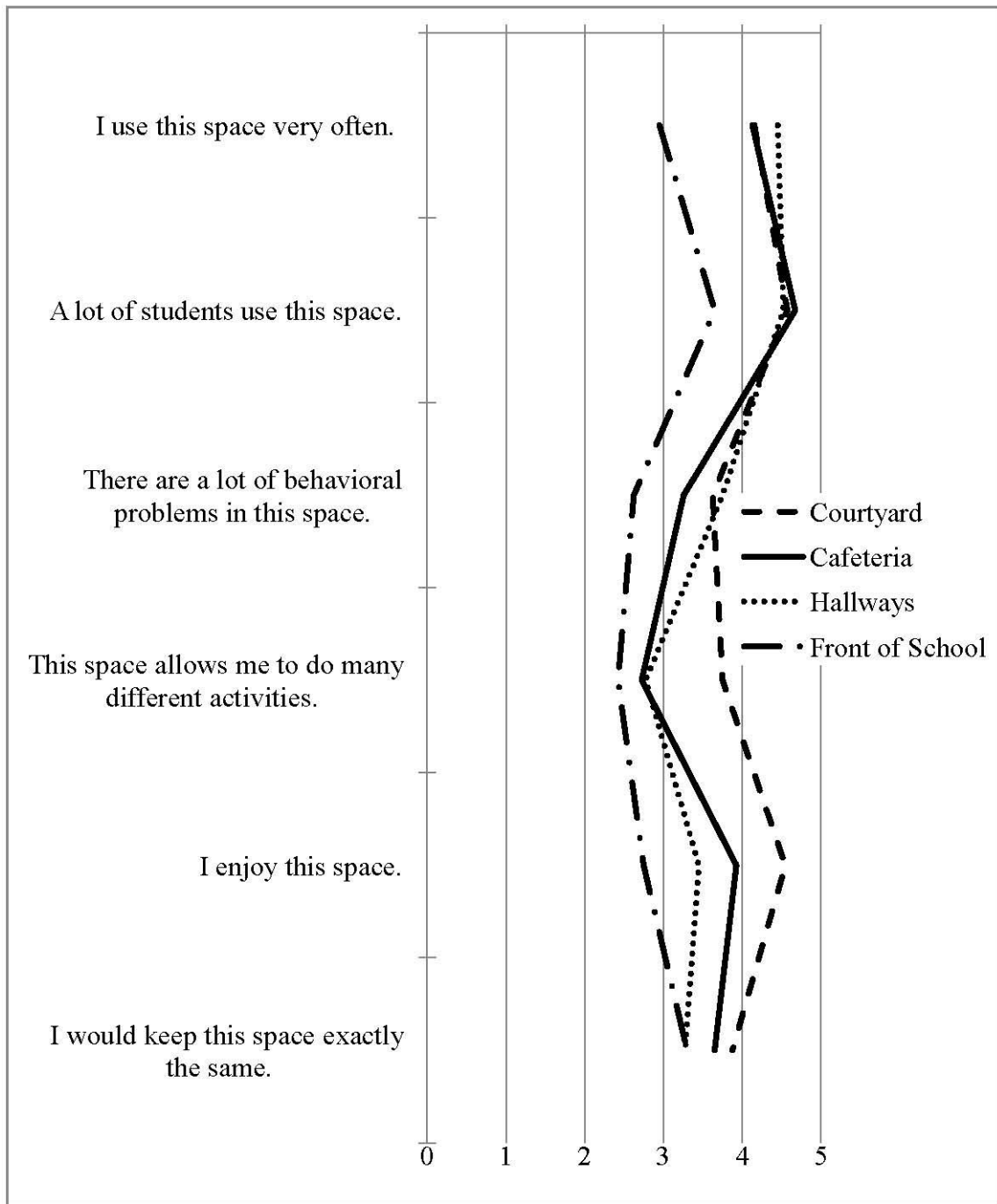


Fig. 12. Mean Values of Variables in Navasota Junior High School Student Survey. Survey respondents were asked to indicate how much they: 5=Strongly Agree; 4=Somewhat Agree; 3=Neither Agree nor Disagree; 2=Somewhat Disagree; 1=Strongly Disagree with the statements.

CHAPTER IV

LIMITATIONS, CONCLUSIONS, AND DISCUSSIONS

Limitations

This study is an informative case study on the relationship between social space design and student behavior in middle schools. There are also several limitations that need to be addressed.

The small sample size prevented the collection of sufficient data for statistical tests. The convenience sample of study schools and participants also limited the generalizations of findings that could be made. Future studies should include schools with a wider array of design characteristics and geographic locations (e.g., rural or urban). It is necessary to have more control over these factors in order to draw significant conclusions from the findings.

In addition, this study analyzed general behavior patterns of students' behavioral problems instead of specific problems such as truancy, theft, or substance abuse studied in previous research (Kumar, et al., 2008). The concept of "behavioral problems" were not accompanied by a very specific definition or list of items, with the hope that an open concept will allow for more non-biased findings for this relatively unstudied area. Yet this general concept makes it difficult to synthesize findings across schools as the definitions of behavioral problems varied across schools. For example, teachers at

Navasota JH focused on the behaviors students would engage in while “hiding,” whereas teachers from Dobie JH focused on more obvious behavioral problems such as running and shoving in the hallways. However, some behavioral problems seemed universal such as physical violence. This study also did not fully account for the role that socio-demographic characteristics could have played in the behavior patterns and uses of spaces. It would also be beneficial to compare the school policies and teacher strategies regarding students’ behavioral problems as they could also have an impact on the pattern of behavioral problems.

In addition to the potential for a more thorough behavioral investigation, there is also room for a more standardized measurement of the social spaces in schools. Due to the fact that this specific research area has not been explored in depth, there were no previously developed and validated instruments that can be used to evaluate social spaces in middle schools. Future research should aim to develop tools that can be used at a variety of types of schools to standardize the measurement of social spaces and make the results of future studies more comparable.

This study was also limited by the lack of consistent participation across the four schools. This limited the possibility of a more in-depth comparison across schools.

Conclusions

The purpose of this study was to analyze the impact of social space design on students' behavioral problems in middle schools. Both the qualitative and quantitative data collected during the interviews, focus groups, and surveys showed that there is a relationship between the two variables. While it is not possible from this study to identify to what extent this relationship is, the results clearly show that social space design is an important feature in educational facility design.

While the initial framework for this study uses various design attributes to classify the spaces such as the amount of seating, privacy, equipment, structure or open space provided as well as the students' rankings and opinions of spaces, the feedback received in the open-ended questions and in the focus groups showed that the amount of space offered or the number of teachers present in the space had the most impact on the students' behavior. Students showed a high level of adaptation to the spaces offered and positively used whatever space that was available. However, it is possible that student behavior would improve greatly if the school provided more spaces with thoughtful design to accommodate their activities.

Differences across the schools

Both the teacher and the student surveys reported various opinions regarding the social space provided and the behavioral patterns within their school. There were some major differences that were seen across the schools and between the teachers and the students.

In terms of quantity, Caldwell MS provides its students more space than the other schools. This space is mostly outdoors and it is the only school where students are allowed to use the football field and track during their lunch time. The design of the school also has minimal hallways and hallway spaces were rarely mentioned as problem areas. Instead, many of the behavioral issues occur in the morning when all students are concentrated in the gymnasium. Navasota and Corbett JH also allow their students to spend time outdoors but do not provide any structured spaces such as a football field or track. Instead, the areas they provide are bounded and prone to overcrowding. It is reasonable to expect that the benefits of additional outdoor space are limited if the space is not large enough and well-structured to accommodate activities.

Dobie JH has the most scattered floor plan of the four schools, creating problems with traffic flow and the limited ability to supervise all areas. Navasota Junior JH has a more simple design and thus, has fewer problems with supervision. Corbett Junior High's floor plan has medium level of layout complexity but the school attempts to counter any problems with supervision by installing multiple security cameras around the campus.

Overall, the teachers at Caldwell MS perceive their school as having less behavioral problems when compared to Corbett and Navasota JH. This can be seen in the average responses to every single survey question on student behavior (Figure 9). While it is apparent that there are less behavioral problems at Caldwell MS, it may not be necessarily due to differences in design but could instead be caused by differences in the

student population itself, school policy, teacher practice regarding students' behavioral problems, or the culture of the school and neighborhood. However, it is still possible that the lower occurrence of behavioral problems could be attributed to the increased quantity of social space offered as well as the fact that students have access to the outdoors during their lunch time.

Conversely, Navasota JH has the highest amount of perceived behavioral problems, as shown in not only the survey results but also the Student Focus Groups. This finding contradicts with the results from the Teacher Focus Group as the teachers stated they felt that Navasota JH does not have any more problems than the typical junior high school. They felt that behavioral problems are a result of the age group, not the school environment. However, the differences in the collected data show that the environment does have a role. An interesting finding is that Corbett JH seems to consistently fall in the middle range in regards to reported behavioral problems when compared to Caldwell MS and Navasota JH. Perhaps this is because Corbett JH is a new school and is still in the process of adjusting to the "better designed" space, thus causing the students to struggle with altering previous behavioral patterns to the new space.

Differences between students and teachers

The results of this study showed that it is important to consider all users of a space when analyzing its design. In this case, the students differed from the teachers on their opinions of the social space design and student behavior. The most notable difference in both the surveys and focus groups was the issue of privacy. In general, students do not feel that they have enough privacy throughout the school day. While one may assume that any student would say this as they would all desire to be rid of any supervision and have the freedom to do what they want, it appears that the students have a more practical take. Alongside the issue of privacy comes the issue of safety, and students do still want to have the presence of teachers to help them remain safe.

The issue of safety was also identified from the results of student surveys at Navasota JH. While the majority of students listed the courtyard as their favorite social space, the students and the teachers labeled it as the space with the most behavioral problems. Generally, their opinion of the amount of negative behavior occurring in these spaces matched their level of desire to spend time in these spaces. It can be assumed that if more students desire to spend time in a space, the space is therefore more populated. This being the case, there is a relationship between the number of students in a space and the behavioral problems that occur within the space.

In general, teachers were more positive about the schools' social spaces than the students were. This is an important finding as these spaces are used primarily by the students, not

by the teachers. The only elements of design that students were significantly more satisfied with than the teachers relate to the amount of activities they can do in a space and the amount of equipment and structure provided. These are all related in that it is this equipment and structure that is thought to increase the variety of activities possible. However, since the students are satisfied with the amount of equipment and structure provided and also feel that they can participate in a variety of activities, it can be inferred that the students adapt to the spaces that they are given. It is also possible that equipment and structure could limit the amount of activities possible. This makes design difficult as it is nearly impossible to define a list of desired activities with such a varied group of students. However, it is important to attempt to provide as much variety as possible as adolescents often connect options of activities and spaces with positive emotions and outlooks (Korpela, 1992). Thus, it is important to provide enough unplanned space to allow for a variety of activities while also considering a small amount of equipment and structure.

Students also reported problems that the teachers are either not aware of or do not feel are important factors in the social spaces. For example, students at Navasota JH repeatedly mentioned the recurrent vandalism in the bathrooms and broken benches in their outdoor areas. While the school may be making efforts to solve these problems, it is clear that they impact the students' experience at school. While this study does not analyze the exact impact these specific environmental issues have on the students, the fact that they were mentioned in both the survey responses and the student focus group

supports the research completed by Evans et al. (2010) on the correlation between poor facilities and student opinion.

Discussion

Through principal interviews, teacher and student focus groups and survey responses, a few key issues emerged as being most relevant to school social space design and its impact on student behavior. While the designs of the schools are very different, overcrowding, supervision, and the balance of privacy and safety emerged as the main issues regarding social space design and behavioral patterns. The importance of student involvement in educational facility design was also exemplified throughout the study.

Overcrowding

The courtyard at Navasota is heavily used by its students both before and after school and during lunch. While there are plenty of tables to accommodate all of the students in both the cafeteria and the courtyard, the space does not meet the students' needs considering the increased use of the courtyard over the cafeteria. This creates an overcrowded environment in which teachers expressed the inability to detect behavioral problems as they arise. Crowding also impacts the students' enjoyment of the spaces. When asked, "What would you do to change this space?" the students stated that in both the cafeteria and the courtyard they would "add a lot of seats" or "try to make it bigger." Hallways are also consistently overcrowded as they are flanked with lockers on both sides at both Navasota and Dobie JH. These lockers, when open, limit the available area

for traffic flow. Also, teachers stated that students at both schools tend to share lockers with their friends, creating clumps of people moving from spot to spot. A comment made in the principal interviews as well as the Teacher and Student Focus Groups was that overcrowding in hallways causes students to accidentally knock into each other, an act often misinterpreted as violence and resulted in a fight.

Supervision

Confirming what has been found in previous studies, supervision is also an important element to consider in school design. The teachers participating in the Focus Group at Navasota JH identified the middle portion of the secondary hallways as design issues due to the fact that in the center there are doors to science labs instead of classrooms. This creates a space that is not as supervised or trafficked by teachers and students entering classrooms, and a prime location for students to gather.

The Teacher Focus Group completed at Dobie JH revolved around a floor plan that is much different from Navasota's as it has two floors with the cafeteria in the center and multiple hallways added on in sporadic ways to its corners. This being the case, most of the discussion focused on activities that go on in these difficult-to-supervise areas rather than behavioral problems in spaces designated for social use. Such areas consisted of nooks and corners where two hallways meet, secluded staircases, and even outdoor areas that are out of sight from teachers' supervision. Few such areas exist at Navasota JH and

when they did occur, they were mentioned in the Focus Group by teachers as also being points of concern.

Balance between privacy and safety

Privacy was an issue not heavily addressed by teachers but students participating in the Focus Group at Navasota JH gave light to its importance. However, it was not simply the issue of wanting space to be alone but also wanting a space to feel safe. While more supervision does decrease the amount of behavioral problems, it lowers the student satisfaction of the experience within a space. In reference to the amount of teachers present, one student stated he preferred “enough (teachers) to keep everything in control but still...have a little bit of freedom.” A student also mentioned how he did not feel safe in the cafeteria as it was too crowded. The area in and outside of the library was mentioned as another place of seclusion as it is “so quiet and warm” and they “don’t have to deal with anybody.”

Building a school with a floor plan that has no “dead space” is one way to achieve this balance of privacy and safety. Schools group their spaces together in a variety of ways. Some divide the floor plan up by classrooms, cafeteria, gymnasiums, and elective spaces; Navasota JH and Dobie JH both use this design method. However, when this occurs and those spaces are not being used (such as no elective classes during a certain time of day), the spaces become dead spaces and prime locations for students’ behavioral problems. This can be seen in the center of Navasota JH’s hallways, where

the science labs and closets are grouped together in the center and create a dead space around their entrances. Students recognize these spaces' lack of supervision and turn them into unsafe areas. Dobie JH has behavioral problems outside their breezeway, where there are not any classrooms, simply lockers and a hallway. Overall, this study showed that it would be beneficial for schools to position their various spaces in a manner that creates a constant flow of traffic. This will result in areas that feel "safe" to students but without needing a teacher stationed there at all times.

Student involvement in educational facility design

This study also adds to the growing number of studies that address the importance of involving students in school design, as they are the primary users of school space. All of the responses from students when invited to participate in this study were positive regarding the fact that their voices are being heard. Many students even asked if their principal would see the results as they felt their discussion could lead to meaningful changes. This enthusiasm and curiosity supports the ideas developed by Ghaziani (2008), the results of the "School I'd Like" Competition (Burke & Grosvenor, 2003), and "Joinedupdesignforschools" project (Sorrell & Sorrell, 2005). The students show that they can be a viable asset to designers and are the best sources of understanding how the spaces are being used and appreciated. Students have a voice and it is the responsibility of the designers, researchers, and administrators to let it be heard as often as possible.

REFERENCES

- Aker, J. M. (2009). Get educated on prototype design. *Buildings*, 103, 44-46.
- Allodi, M. (2010). The meaning of social climate of learning environments: Some reasons why we do not care enough about it. *Learning Environments Research*, 13, 89-104.
- Burke, C., & Grosvenor, I. (2003). *The school I'd like: Children and young people's reflections on an education for the 21st century*. New York, NY: RoutledgeFalmer.
- Caudill, W. W. (1954). *Toward better school design*. New York City: F. W. Dodge Corporations.
- Cemalcilar, Z. (2010). Schools as socialisation contexts: Understanding the impact of school climate factors on students' sense of school belonging. *Applied Psychology*, 59, 243-272.
- Clark, C., & Uzzell, D. L. (2002). The affordances of the home, neighbourhood, school and town centre for adolescents *Journal of Environmental Psychology*, 22, 95-108.
- Evans, G. W., & Stecker, R. (2004). Motivational consequences of environmental stress. *Journal of Environmental Psychology*, 24, 143-165.
- Evans, G. W., Yoo, M. J., & Sipple, J. (2010). The ecological context of student achievement: School building quality effects are exacerbated by high levels of student mobility. *Journal of Environmental Psychology*, 30, 239-244.

- Ghaziani, R. (2008). Children's voices: raised issues for school design. [Article].
CoDesign, 4, 225-236.
- Gislason, N. (2010). Architectural design and the learning environment: A framework for school design research. *Learning Environments Research*, 13, 127-145.
- Korpela, K. M. (1992). Adolescents' favourite places and environmental self-regulation. *Journal of Environmental Psychology*, 12, 249-258.
- Kumar, R., O'Malley, P. M., & Johnston, L. D. (2008). Association between physical environment of secondary schools and student problem behavior: A national study, 2000-2003. *Environment and Behavior*, 40, 455-486.
- Kutnick, P., & Kington, A. (2005). Children's friendships and learning in school: Cognitive enhancement through social interaction? *British Journal of Educational Psychology*, 75, 521-538.
- Liu, J. H., & Sibley, C. G. (2004). Attitudes and behavior in social space: Public good interventions based on shared representations and environmental influences. *Journal of Environmental Psychology*, 24, 373-384.
- McGowen, R. S. (2007). *The impact of school facilities on student achievement, attendance, behavior, completion rate and teacher turnover rate in selected Texas high schools*. Doctor of Philosophy Dissertation, Texas A&M University, College Station, TX.
- Mitchell, D. C. (1967). *Pupil classroom behavior scale*. University of Maryland Pupil Services Project.

- Newman, M., & Thomas, P. (2008). Student participation in school design: One school's approach to student engagement in the BSF process. [Article]. *CoDesign*, 4, 237-251.
- Owens, R. G., & Valesky, T. C. (2007). *Organizational behavior in education: Adaptive leadership and school reform* (9th ed.). Toronto, Canada: Pearson Education, Inc.
- Planty, M., Hussar, W., Snyder, T., Kena, G., KewalRamani, A., Kemp, J., . . . Dinkes, R. (2009). *The Condition of Education 2009*. Washington, D.C.
- Shapiro, S. (1975). Preschool ecology: A study of three environmental variables. *Reading Improvement*, 12, 236-241.
- Sorrell, J., & Sorrell, F. (2005). *Joined up design for schools*. London, Great Britain: Merrell Publishers, LTD.
- Weinstein, C. S., & Woolfolk, A. E. (1981). The classroom setting as a source of expectations about teachers and pupils. *Journal of Environmental Psychology*, 1, 117-129.

APPENDIX A

PUPIL CLASSROOM BEHAVIOR SCALE

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PUPIL CLASSROOM BEHAVIOR SCALE University of Maryland Pupil Services Project

Objectives of this Scale

It has been shown that a teacher's professional judgment of a student's behavior is one of the most useful and valid sources of information about a pupil's growth and development. Your professional training and day-to-day experiences with children in work and play, in relaxed and stressful situations, have helped sharpen your judgment. Thus we would like to take advantage of your judgment in assessing the children you teach as one way of determining the characteristics of the children in the research schools. Data from each school will be programmed into a computer for comparison of all students as a school group with others.

INSTRUCTIONS

- A. The behaviors on which we would like you to rate your students are printed on the attached pages. The number preceding each behavior corresponds to the number on the answer sheet.
- B. This research is primarily concerned with the characteristics of groups of children in the schools. Therefore, give your best judgment of each child on the basis of the experience you have had with him or her, however much it has been, without spending too much time worrying about whether your response is exactly right. Few professional persons, no matter how well trained, can make ratings of others with absolute certainty and complete comfort. The fact that you may have inadvertently made an error with one child, or on further analysis and consideration might rate a few slightly differently, will not have much effect on computation for all the children taken together.
- C. Please look at the enclosed answer sheets. Notice that there is space to rate 4 pupils on each answer sheet. At the top of each answer sheet there are spaces to mark your Teacher Number. If your Teacher Number were "1258" you would mark as follows:

Teacher	1	0	1	2	3	4	5	6	7	8	9
Number	2	0	1	2	3	4	5	6	7	8	9
	5	0	1	2	3	4	5	6	7	8	9
	8	0	1	2	3	4	5	6	7	8	9

- D. There is also a space to write the pupil identification number of each pupil you rate. Four rows are shown on the answer sheet for the Student Number. Please write the pupil's number from top to bottom in the boxes as shown below. Then blacken in the corresponding spaces as shown in the following examples.

Pupil No. 0301

Student	0	0	1	2	3	4	5	6	7	8	9
Number	3	0	1	2	3	4	5	6	7	8	9
	0	0	1	2	3	4	5	6	7	8	9
	1	0	1	2	3	4	5	6	7	8	9

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Pupil No. 5019

Student Number	5	0	1	2	3	4	5	6	7	8	9
	0	0	1	2	3	4	5	6	7	8	9
	1	0	1	2	3	4	5	6	7	8	9
	9	0	1	2	3	4	5	6	7	8	9

E. Beginning with the first pupil on your class list rate this pupil on each behavior using the scale printed below:

1. almost never or never
2. not very often
3. sometimes
4. quite often
5. most of the time

F. After you have rated the first pupil on each behavior, then rate the next until all have been rated.

D-5

APPENDIX B

TEACHER SURVEY

Corbett Junior High School



Student Behavior Survey

For each of the following statements, place a mark on the line to indicate the percentage of students in your classes who reflect the trait or actions (e.g. "0%" or "100%").	Percentage of Students
1. Shows enthusiasm toward learning activities, being with classmates and, in general, being in school.	0% _____ 100%
2. Cooperates with teacher requests for quiet, for starting work and for changing activities.	0% _____ 100%
3. Behaves well during free time (recess, lunch, before/after school).	0% _____ 100%
4. Blows up, becomes excited, and loses self-control when unable to do what he wants to do.	0% _____ 100%
5. Chooses specific locations to participate in negative behavioral patterns (fights, stealing, etc.)	0% _____ 100%
6. Shows little concern for the needs, problems and feelings of others.	0% _____ 100%
7. Has difficulty following teacher directions or instructions.	0% _____ 100%
8. Disobeys or rebels against reasonable school authority (teachers, rules, regulations).	0% _____ 100%
9. Gets into fights or quarrels with other pupils.	0% _____ 100%
10. Has to be coaxed or forced to work or play with others.	0% _____ 100%
11. Makes unusual or inappropriate responses during normal school activities.	0% _____ 100%
12. Behaves in ways which are dangerous to self or others.	0% _____ 100%
13. Is unhappy or depressed.	0% _____ 100%
14. Becomes upset or sick when faced with a difficult school problem or situation.	0% _____ 100%



Social Environment Survey

Please tell us how much you agree or disagree with each statement by circling your answers.

	Strongly disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree
1. Our school has enough social spaces to meet the students' socialization needs.	1	2	3	4	5
2. Our school gives the students enough free time to socialize.	1	2	3	4	5
3. Our school's social space design allows for a variety of activities for students during their free time.	1	2	3	4	5
4. There is enough of each of the following design elements in our school's social spaces. (Please answer for each design element listed below on the scale to the right)					
a. enough seating	1	2	3	4	5
b. enough privacy	1	2	3	4	5
c. enough equipment (e.g. items for games, structures to play on, sports balls)	1	2	3	4	5
d. enough structure (defined areas for certain activities)	1	2	3	4	5
e. enough open space	1	2	3	4	5
5. There are a lot of behavioral problems at our school during students' free time.	1	2	3	4	5
6. The students at our school do not have a very good relationship with one another.	1	2	3	4	5
7. The design of the social spaces at our school impact the <u>type</u> of behavioral problems that occur.	1	2	3	4	5
8. The design of the social spaces at our school impact the <u>amount</u> of behavioral problems that occur.	1	2	3	4	5

Please answer the following question in the space below.

9. What would be the changes you would make to your school's social space design to reduce students' behavioral problems?

APPENDIX C

STUDENT SURVEY

Navasota Junior High School - Student



Social Environment Survey




Please tell us how much you agree or disagree with each statement by circling your answers.					
	Strongly disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree
1. Our school has enough social spaces to meet our socialization needs.	1	2	3	4	5
2. Our school gives us enough free time to socialize.	1	2	3	4	5
3. Our school's social space design allows for a variety of activities during our free time.	1	2	3	4	5
4. I would enjoy my free time more if the social space design at my school was different.	1	2	3	4	5
5. There is enough of each of the following design elements in our school's social spaces. (Please answer for each design element listed below on the scale to the right)					
a. enough seating	1	2	3	4	5
b. enough privacy	1	2	3	4	5
c. enough equipment (e.g. items for games, structures to play on, sports balls)	1	2	3	4	5
d. enough structure (defined areas for certain activities)	1	2	3	4	5
e. enough open space	1	2	3	4	5
6. There are a lot of behavioral problems at our school during our free time.	1	2	3	4	5
7. The students at our school do not have a very good relationship with one another.	1	2	3	4	5
8. The design of the social spaces at our school impact the type of behavioral problems that occur.	1	2	3	4	5
9. The design of the social spaces at our school impact the amount of behavioral problems that occur.	1	2	3	4	5

Please answer the following question in the space below.

10. What would be the changes you would make to your school's social space design to reduce behavioral problems?

Social Space Photograph Survey

Please tell us how much you agree or disagree with each statement by circling your answers underneath each of the photos on the right.

																				
	Strongly Disagree	Some-what disagree	Neither disagree nor agree	Some-what agree	Strongly agree	Strongly Disagree	Some-what disagree	Neither disagree nor agree	Some-what agree	Strongly agree	Strongly Disagree	Some-what disagree	Neither disagree nor agree	Some-what agree	Strongly agree	Strongly Disagree	Some-what disagree	Neither disagree nor agree	Some-what agree	Strongly agree
1. I use this space very often.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2. A lot of students use this space.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3. There are a lot of behavioral problems in this space.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4. This space allows me to do many different activities.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6. I enjoy this space.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7. I would keep this space exactly the same.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8. Please rank each space from your favorite to least favorite by numbering from 1 (most favorite) to 4 (least favorite) in the spaces to the right.	Rank ____					Rank ____					Rank ____					Rank ____				
Please answer the questions below for each photo.																				
9. What types of activity do you do in this space?																				
10. What would you do to change this space?																				

APPENDIX D

INSTITUTIONAL REVIEW BOARD APPROVAL

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TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH AND GRADUATE STUDIES - OFFICE OF RESEARCH COMPLIANCE

1186 TAMU, General Services Complex
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Human Subjects Protection Program

Institutional Review Board

DATE: 19-Jan-2011**MEMORANDUM****TO:** SCHNEIDER, RAEHEL
77843-3578**FROM:** Office of Research Compliance
Institutional Review Board**SUBJECT:** Initial Review**Protocol Number:** 2010-0886**Title:** Social affordances and their impact on student behavior in middle schools**Review Category:** Expedited**Approval Period:** 19-Jan-2011 To 18-Jan-2012**Approval determination was based on the following Code of Federal Regulations:**

45 CFR 46.110(b)(1) - Some or all of the research appearing on the list and found by the reviewer (s) to involve no more than minimal risk.

 (7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation or quality assurance methodologies.

(Note: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b) (3). This listing refers only to research that is not exempt.)

Provisions:

This research project has been approved for one (1) year. As principal investigator, you assume the following responsibilities

1. **Continuing Review:** The protocol must be renewed each year in order to continue with the research project. A Continuing Review along with required documents must be

<http://rf-infoed1.tamu.edu/administration/ShowPDF.asp?UCommID=56C67489-D235-41...> 1/21/2011

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submitted 30 days before the end of the approval period. Failure to do so may result in processing delays and/or non-renewal.

2. **Completion Report:** Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the IRB Office.
3. **Adverse Events:** Adverse events must be reported to the IRB Office immediately.
4. **Amendments:** Changes to the protocol must be requested by submitting an Amendment to the IRB Office for review. The Amendment must be approved by the IRB before being implemented.
5. **Informed Consent:** Information must be presented to enable persons to voluntarily decide whether or not to participate in the research project.

This electronic document provides notification of the review results by the Institutional Review Board.

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